

What is claimed is:

- 1 1. A freely rotatable micromechanical plate apparatus, comprising:
 - 2 at least three rotatable plates, each of said rotatable plates being suspended from a
 - 3 substrate via a respective first spring;
 - 4 a moveable plate;
 - 5 at least three moveable plate attachment points, each of said moveable plate
 - 6 attachment points being coupled to a respective one of said rotatable plates via respective
 - 7 ones of second springs so that rotation of each of said rotatable plates about a respective
 - 8 axis transfers motion to the moveable plate attachment points; and
 - 9 at least three posts, each of said posts coupling the movement of each of a
 - 10 respective one of said moveable plate attachment points to said moveable plate.
- 1 2. The invention as defined in claim 1 wherein said moveable plate is a mirror.
- 1 3. The invention as defined in claim 1 wherein said springs are deformable elastic
- 2 elements.
- 1 4. The invention as defined in claim 1 wherein at least one of said springs is a
- 2 relatively thin beam.
- 1 5. The invention as defined in claim 1 wherein at least one of said springs is a
- 2 folded set of beams.
- 1 6. The invention as defined in claim 1 wherein at least one of said first springs is
- 2 located along an edge of its associated rotatable plate and acts as the axis of rotation
- 3 therefore.
- 1 7. The invention as defined in claim 1 further comprising at least one electrode
- 2 located below at least one of said rotatable plates.

1 8. The invention as defined in claim 1 further comprising an additional plate, said
2 additional plate being coupled to at least one of said rotatable plates and being adapted to
3 rotate said rotatable plate.

1 9. The invention as defined in claim 8 wherein said additional plate is coupled to
2 said rotatable plate by at least one spring.

1 10. The invention as defined in claim 8 wherein said additional plate is adapted
2 to rotate said rotatable plate using angle amplification.

1 11. The invention as defined in claim 8 further comprising at least one electrode
2 operable to move said additional plate.

1 12. The invention as defined in claim 8 further comprising at least a comb drive
2 operable to move said additional plate.

1 13. The invention as defined in claim 1 wherein at least one of said rotatable
2 plates incorporates fingers that are part of a comb drive.

1 14. The invention as defined in claim 1 wherein at least one of said rotatable
2 plates is a vestigial rotatable plate.

1 15. A method for making a freely rotatable micromechanical plate apparatus,
2 comprising:

3 suspending from a substrate via a respective one of a first set of springs each of at
4 least three rotatable plates;

5 coupling each of at least three moveable plate attachment points to a respective
6 one of said rotatable plates via respective ones of a second set springs so that rotation of
7 each of said rotatable plates about a respective axis transfers motion to the moveable plate
8 attachment points; and

9 coupling a moveable plate to each of said moveable plate attachment points via a
10 respective one of least three posts, each of said posts coupling the movement of each of a
11 respective one of said moveable plate attachment points to said moveable plate.